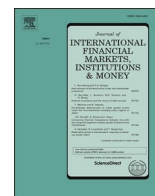


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Financial market development and bank deposits

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ABSTRACT

This paper studies the effects of financial market development on bank deposits in a cross-country setting. Our empirical evidence shows that investors in developed and developing economies engage with financial markets differently, leading to varying impacts on bank deposits. For instance, in financially developed economies, financial markets typically complement the banking sector by facilitating deposit growth. Conversely, in financially developing economies, financial markets and banks often compete for deposits, thereby constraining bank deposits growth. This dynamic, however, is shaped by country-specific factors such as market concentration and the level of deposit insurance. Moreover, we find that financial market development increases per capita savings, which in turn strengthens bank deposit growth. These findings remain consistent across a range of model specifications and robustness checks.

1. Introduction

Financial development literature distinguishes between market-based and bank-based systems. Both serve the essential function of transferring surplus capital from savers to borrowers, yet the structural emphasis and institutional frameworks within which they operate often differ markedly. These differences not only affect how financial intermediation occurs but also influence the cost of funding, transaction costs, information accessibility, and access to funding, among others (Bats and Houben, 2020; Chakraborty and Ray, 2006; Levine, 2002). A bank-based system, for instance, may offer lower transaction costs and more direct access to credit, whereas a market-based system, by promoting greater transparency and reducing informational frictions, facilitates entrepreneurial financing and fosters innovation-led growth (Levine, 2002; Petersen and Rajan, 1994). The development of financial intermediation frequently focuses on establishing strong financial markets alongside resilient banking systems. However, a critical question remains insufficiently explored: can financial markets and banks coexist, and do they act as substitutes or complements?

While prior studies (e.g., Bats and Houben, 2020; Chakraborty and Ray, 2006; Levine, 2002) have explored the impact of bank-based and market-based economies on economic growth, access to finance, and financial stability, there has been limited research on the relationship between financial markets and the banking system from a saver's viewpoint. Hubbard and O'Brien (2012) and Samarasinghe and Uylangco (2022) have posited that banks and financial markets may compete for household savings, potentially

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leading to a shift away from traditional retail deposits. Although this behaviour has been studied at the individual level (Calvet et al., 2009; Kimball et al., 2020), there has been limited research on how these behaviours affect both the banking system and banks' liquidity management. Thus, our study attempts to explore whether the relationship between financial market development and both the growth and composition of bank deposits varies with countries' economic and financial development levels.

The relationship between banks and financial markets not only depends on the level of financial inclusion but also on other financial institutions, including mutual funds, and insurance companies (Gilkeson et al., 1999). While greater financial inclusion expands access to the formal banking system, financial deepening broadens access to a range of financial institutions. This diversification promotes robust competition between banks and non-bank channels, incentivizing them to innovate and offer more attractive financial products. As a result, investors may be less inclined to rely solely on traditional bank deposit products (Hubbard and O'Brien, 2012).

Financial markets and banks not only compete for funds to meet their liquidity needs but also complement each other by cross-selling financial products, raising capital and engaging in securitisation (Song and Thakor, 2010). The increasing functional integration between financial markets and the banking system encourages banks to make greater use of financial markets, often relying on wholesale funding during periods of heightened lending demand (Damar et al., 2013; Pérignon et al., 2018). Increased use of wholesale funding increases fragility in the banking system (Demirgüç-Kunt and Huizinga, 2010; Huang and Ratnovski, 2011), whereas deposit funding brings stability to the banking system, as reflected in the Basel-III norms.

Basel-III encourages banks to increase their deposit funding to comply with the liquidity coverage ratio (LCR) and net-stable funding ratio (NSFR) (King, 2013). It focuses not only on total deposits but also on the composition of deposits by dividing deposits into stable and less-stable deposits. Stable deposits are defined as insured deposits and time deposits with a maturity exceeding 30 days, while all other deposits are classified as less stable. By assigning lower run-off factors to stable deposits, regulatory frameworks incentivize banks to attract a greater proportion of stable funding, thereby mitigating liquidity risk (BCBS, 2014; Pohl, 2017).

Prior studies (e.g., Allen and Carletti, 2010; Boot and Thakor, 1997; Song and Thakor, 2010) predominantly examine the association between banks and financial markets in terms of lending behaviour. For instance, Song and Thakor (2010) argue that banking and financial markets compete for loans in fragmented markets but complement each other in financially integrated and developed markets. However, this leaves the question of how financial market development affects banks' deposit funding and its composition.

We argue that due to the heterogeneous characteristics of deposits,¹ the impact of financial market development on various types of deposits is likely to differ. Furthermore, we acknowledge that variations in macroeconomic conditions and levels of financial development may influence the nature and strength of the relationship between financial market development and bank deposits.

To examine empirically whether financial markets and banks compete or complement each other in meeting their liquidity needs, we use a large sample of bank-level data on 4853 banks across 122 countries over the period 2002–2015. We examine bank deposits as a critical regulatory issue at the micro-level. Our findings show that both total deposits and retail transaction deposits expand as financial markets develop, indicating a complementary relationship between financial markets and bank deposits. We observe that a one standard deviation increase in our financial market index leads to 17.08 % increase in total deposits and a 26.7 % increase in retail transaction deposits.

Conversely, time deposits show a negative association with the financial market indices, indicating competition for long-term funding between financial markets and the banking system. A one standard deviation increase in the financial market index leads to 22.12 % decrease in time deposit growth.

Our analysis encompasses countries with diverse financial system characteristics, including those dominated by banks and those with well-developed financial markets. The countries included in the analysis exhibit varying levels of economic development. We capture this heterogeneity by applying interaction terms between high-income, high-financially developed economies, and financial market indices. The results indicate that financial market development exerts a positive effect on bank deposits in more financially developed economies. In contrast, in countries with lower levels of financial and economic development, financial market development negatively impacts bank deposits, suggesting a competitive relationship between financial markets and the banking sector.

The stringency of banking supervision varies across countries, influencing the degree of trust in the formal banking system. Likewise, market concentration affects the level of competition within the banking sector. We anticipate that the relationship between financial markets and banks will vary across countries with different regulatory and market structures. Our findings indicate that in banking systems characterized by stringent supervision, banks and financial markets tend to complement to each other, whereas in less supervised environments, they are more likely to compete. We observe that banks and financial markets complement each other in attracting household deposits but compete for long-term deposits.

In addition, we extend our interaction analysis to consider the level of deposit insurance, recognizing that deposit insurance enhances deposit stickiness, thereby increasing bank deposits (Iyer and Puri, 2012). The effect of financial market development on bank deposits may differ across these subgroups accordingly. Results suggest that in economies with limited deposit insurance coverage, financial market development contributes to greater volatility in bank deposits.

Our study contributes to the banking literature in several ways. First, building on foundational work on bank funding structures, we examine the impact of financial market development on banks' deposit funding, distinguishing between retail and time deposits, an area that has received limited empirical attention in prior research (Boot and Thakor, 1997; Samarasinghe and Uylangco, 2021, 2022;

¹ For example, demand deposits are liquid in nature and rate insensitive, as per liquidity preference theory. On the contrary, time deposits are an investment vehicle and rate sensitive. These differences in characteristics of deposit products are also highlighted by Basel III (BCBS, 2014; Pohl, 2017).

Song and Thakor, 2010). Our results indicate that financial development affects these subcategories differently: retail deposits tend to increase with financial market development, reflecting greater depositor confidence and accessibility in well-developed financial markets, whereas time deposits often decrease, suggesting a partial substitution of long-term deposits with market-based funding instruments. This explicit differentiation highlights the heterogeneous nature of bank funding responses and underscores the relevance of our findings for compliance with Basel-III liquidity norms.

Second, our study expands the scope of the financial market development literature by employing a comprehensive financial market index encompassing liquidity, market capitalization, equity issuance, and activity in debt markets. This multidimensional measure captures nuanced effects that single proxies, such as stock market liquidity or capitalization, may overlook. Importantly, financial market development has distinct effects on deposit types, increasing retail deposits while lowering time deposits, reflecting country-specific shifts in banks' funding preferences.

Third, we contribute to the literature on financial integration and financial system structure (Fratzscher, 2002; Friedrich, Schnabel, and Zettelmeyer, 2013; Korajczyk, 1996) by analyzing cross-country heterogeneity in bank-market interactions. By segmenting countries based on deposit insurance, supervisory quality, and broader macro-financial environments, such as crisis periods, market concentration, and governance indices, our study emphasizes the contextual factors that shape the differential effects of financial development on retail and time deposits, enriching the market discipline literature (Barth, Lin, Ma, Seade, and Song, 2013; Martinez Peria and Schmukler, 2001). Overall, our findings not only clarify how financial development influences the composition of bank deposits but also provide policy-relevant insights for regulators and bank managers seeking to balance depositor stability with market-based funding strategies. For example, in more financially developed economies, banks tend to attract greater deposit inflows as financial markets deepen, suggesting that financial markets and banks can operate in a complementary manner rather than as substitutes. This suggests that regulatory efforts should prioritize the promotion of comprehensive financial development, including both equity and debt markets, to enhance the resilience of the banking sector and support compliance with Basel-III liquidity standards.

Conversely, in economies with limited deposit insurance coverage, heightened financial market activity may induce volatility in bank funding and potentially destabilize traditional deposit bases. In such contexts, policymakers should consider strengthening the scope and credibility of deposit insurance schemes to bolster depositor confidence and stabilize deposits. The findings also underscore the importance of improving supervisory quality and implementing well-calibrated competition policies as a means to reinforce banks' capacity to attract stable deposit funding.

The paper is organized as follows. Section 2 discusses the existing literature on the banking system, financial markets, and financial structure, and develops testable hypotheses. Section 3 explains data collection and methodology. The empirical findings are included in Section 4, followed by some robustness tests in section 5. Section 6 concludes with policy implications.

2. Prior literature and hypothesis development

Prior literature on financial development identifies two broad categories: bank-based and market-based systems. Economists who support *bank-based* systems, also known as relationship banking, argue that banks play an important role in acquiring information related to firms and managers, improving capital allocation, and thus supporting economic growth (Arestis, Demetriades, and Luintel, 2001; Izadi and Saadi, 2023; Levine, 1998, 2002; Thakor, 1996). This relationship banking is fruitful during a crisis period for the borrowers. Banks offer lower interest rates on loans and favourable terms and conditions on loans to borrowers, which are essential for the survival of firms during a crisis (Banerjee et al., 2021; Beck et al., 2018; Bolton et al., 2016). Furthermore, the benefits of relationship-based funding and a dominant banking system ensures borrowers repay loans in a weaker regulatory environment (Levine, 2002; Rajan and Zingales, 1998).

In contrast, the supporters of *market-based* systems highlight the role of financial markets in disseminating information, improving corporate governance, and allocating capital (Bats and Houben, 2020; Beck et al., 2010), which in turn support economic growth (Allen and Santomero, 1997; Goldstein, 2023; Greenwood and Smith, 1997; Levine, 1997; Sirri and Tufano, 1995). Nevertheless, Tadesse (2002) argues that while a *market-based* financial system outperforms in developed economies with good governance, a *bank-based* system is effective in developing and underdeveloped economies.

Another strand of literature has developed that examines the direct association between the financial system and economic growth, and documents mixed results. For example, Kaminsky and Reinhart (1999) and Schularick and Taylor (2012) document a negative relationship between financial system development and economic growth. In contrast, Narayan and Narayan (2013) find a positive effect of financial development on economic growth in middle-income countries, but argue that this effect tends to dissipate as a country approaches the high-income category. Similarly, Cecchetti and Kharroubi (2012) and Arcand et al. (2015) document a non-linear ("U-shaped") relationship between financial development and economic growth. Prior research has predominantly concentrated on the utilisation of funds on the asset side of intermediaries' balance sheets, rather than the liability side, specifically deposits, which are the focus of our paper.

The mobilization of funds from savers to borrowers creates competition among financial intermediaries, including financial markets and banks. Investors and borrowers prefer one channel or the other, according to their requirements, expectations, and status. The degree of information asymmetry and its management play a crucial role in this choice. For instance, new borrowers or start-up companies prefer borrowing from banks, while well-established firms with strong reputations seek funding from the general public (Boot and Thakor, 1997). Similarly, Bolton and Freixas (2000) contend that large, safe firms prefer to finance their needs through equity or bond markets, while distressed or high-risk firms are more likely to rely on bank financing.

On the liability side of the intermediation process, investors with higher risk appetites are willing to invest directly in capital markets, whereas those with lower risk appetite prefer to save in banks. This behaviour strengthens with more financial inclusion and

innovations, leading to limiting banks' power in attracting deposits (Hubbard and O'Brien, 2012). The growing use of commercial paper, mutual funds, hedge funds, and other financial instruments such as shares and bonds, has made it more challenging for banks to attract households for retail deposits, hence decreasing deposit funding in banks.

Although banks offer a variety of deposit products such as demand, savings, and time deposits to address the needs of different households, the usage of deposit products varies with households' characteristics such as income, gender, and education levels. According to Godley (1999), households shift their funds from demand to time deposits as their income increases. This shift is also based on institutional and regulatory quality. Guiso and Sodini (2013) argue that households' needs and expectations shape their choice of financial products and financial intermediaries, with the institutional and regulatory environment playing a crucial role in guiding these decisions. For example, Bordo et al. (2015) show that, due to the underdeveloped banking system during the Industrial Revolution, financial markets assumed a more prominent role in the US economy. The economic situation, regulatory environment, and investors' behaviour collectively determine their choice of one system over another. Notably, investors hold a larger amount of equities and bonds in the US compared to other countries (Allen and Carletti, 2010). Variations in household saving patterns and financial system usage also affect the relative share of bank deposits (Lin, 2020; Samarasinghe and Uylangco, 2022). In response, financial intermediaries compete to attract household savings by offering higher yields and enhanced services. Based on this evidence, we formulate the following testable hypothesis:

H1: The expansion of financial markets negatively impacts the volume of bank deposits by providing households with alternative saving and investment opportunities.

Although both banks and financial markets have the same set of customers and compete to attract them, they both provide a range of other services such as investment management and underwriting, among others, that assist both systems to co-exist. For instance, Demirgüç-Kunt and Levine (1996) argue that an efficient banking system is a prerequisite for the development of well-functioning financial markets. Levine and Zervos (1999) show that both strong financial markets and development of the banking system support higher economic growth. Demirgüç-Kunt et al., (2012) argue that although banks and stock markets are both important for economic development, the role of banks decreases with economic growth whereas stock markets drive increases in the growth of economic activity, suggesting a dynamic relationship between banks, financial markets, and economic growth.

The theoretical work of Song and Thakor (2010) document three forms of relationships between financial markets and banks: competition, complementary, and coevolution. They show that since banks play a crucial role in providing certification of securitization, a complementary relationship is created between financial markets and the banking system. They argue that as stock markets deepen and expand, banks can more readily raise funds for their financing activities. More recently, Boot and Thakor (2025) argue that increased competition within the banking system encourages banks to use financial markets for cheaper sources of funding. Consequently, both the financial markets and the banking system co-evolve in a developed financial environment. Based on these insights, we propose the following two testable hypotheses:

H2A: The effect of financial markets on bank deposits is positive in more financially developed economies.

H2B: The effect of financial markets on bank deposits is negative in less financially developed economies.

3. Data and methodology

3.1. Data

Our sample consists of listed and unlisted banks across 122 countries, spanning 14 years from 2002 to 2015. This period covers several banking and financial market crises and significant regulatory changes.² We construct a comprehensive dataset consisting of 4,853 banks with 39,259 bank-year observations. Our sample composition is reported in Appendix A.1.

We extract bank-level financial statement data from the Fitch Solutions database. We follow the work of Sviryzdenka (2016) and collect data on the financial market index and financial markets depth index from the IMF database. Macroeconomic data such as GDP growth rate, inflation, and GDP per capita are obtained from the World Bank database. Our final sample covers a range of geographic regions including East Asia and Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, and Sub-Saharan Africa. Table 1 presents variable names, definitions, and data sources.

We apply several selection criteria to obtain our final sample. First, we exclude countries for which we have no information on different dimensions of financial development. Second, we exclude bank subsidiaries from the final dataset to reduce the impact of double counting. Third, we exclude banks with fewer than three years of observations.

3.1.1. Dependent variable measures – deposits

While studying the relationship between financial markets and banks, the banking literature has generally focused on total deposits (Samarasinghe and Uylangco, 2021, 2022). In this paper, we focus not only on total deposits but also on different deposit products. We employ three alternative dependent variables including deposit growth (DG), retail transaction deposit growth (DDG), and retail time deposit growth (TDG), to account for the different characteristics of these products. For example, total deposits include deposits and short-term funding, thus including bank deposits, and customers' savings and time deposits. Retail transaction deposits consist only of

² Such as the introduction of Basel II and III and the strengthening of capital requirements.

Table 1
Variable definitions.

Variable	Definition	Source
Dependent variable		
Deposit growth (DG)	(Total deposit t – Total Deposit t_{-1})/ Total Assets t_{-1} *100, where total deposits consist of total customer deposits, deposits from banks, other deposits and short-term borrowings.	Fitch Solutions
Demand deposit growth (DDG)	(Demand deposit t – Demand Deposit t_{-1})/ Total Assets t_{-1} *100, where demand deposits consist total customer current and saving deposits.	Fitch Solutions
Time deposit growth (TDG)	(Customer time deposit t – Customer time Deposit t_{-1})/ Total Assets t_{-1} *100	Fitch Solutions
Variable of interest		
FMI	This index measures the accessibility, depth, and efficiency of financial markets.	IMF
FMD	It measures the depth of financial markets in countries including stock and debt market. It also covers domestic and international markets.	IMF
Bank-level and country-level control variables		
(a) Bank stability		
Capital (CAP)	The ratio of shareholders' fund to total assets	Fitch Solutions
Growth of Loans (LOAN)	Growth of loans – Bank	Fitch Solutions
ROAA (ROA)	Profitability – Return of Average assets	Fitch Solutions
Operational Cost (OC)	Cost to Income ratio	Fitch Solutions
Size (SZE)	Natural logarithm of total assets	Fitch Solutions
(b) Country-level control variables		
INF	Inflation, consumer prices (annual %)	WDI
GDPG	GDP Growth rate	WDI
GPC	Natural logarithm of GDP per capita	WDI
Economic freedom index (EFI)	The score includes property rights, judicial effectiveness, government integrity, tax burden, government spending, fiscal health, business freedom, labour freedom, monetary freedom, trade freedom, investment freedom, financial freedom.	Heritage Foundation
HHID3	Herfindahl-Hirschman Index (Deposit). A country level indicator- concentration of top three banks of each country based on total deposits.	Authors' own calculation
Income	Natural logarithm of GDP per capita	WDI
Deposit Insurance	Dummy variables if country has deposit insurance, the value is given 1 otherwise 0.	WDI
World governance Indicators	The World governance indicators which measure the political stability, control for corruption, voice and accountability, rule of law, regulatory quality, and government effectiveness in countries.	WDI
Instrument Variable		
Law and order	It captures the rule of law of countries. The trust in the judicial system, court, police, and human rights. The Law-and-Order index ranges between 0 and 1. "0" depicts the lowest level of rule of law, and "1" shows the highest level of effectiveness in law and order in the country.	Freedom House

This table reports the variable definitions and the variable sources.

customers' savings and current deposits. These deposits can be withdrawn on demand, hence carry lower interest rates and are less sticky in nature. We also consider retail time deposits from customers. Although these are more costly deposits for banks, they are among the stickiest deposit products, providing stability to funding.

We follow the work of Egan et al. (2017) to construct our dependent variables as below:

$$Y_{bt} = \frac{X_{bt} - X_{bt-1}}{Z_{bt-1}} \quad (1)$$

where Y_{bt} is DG, DDG, and TDG, X_{bt} and X_{bt-1} are total deposits, total retail transaction deposits including customer savings and current deposits, and total retail time deposits of years t and $t-1$ respectively, and Z_{bt-1} is total bank assets in year $t-1$.

3.1.2. Variable of interest – financial market index and financial market depth index

In our analysis, we employ two measures of financial development, namely: (i) financial market index and (ii) financial markets depth index. The financial market index is constructed by combining the efficiency, depth, and accessibility of financial markets for both stocks and debt (Sviryzdenka, 2016).³ The financial market depth index includes the variables stock market capitalization to GDP, stock traded to GDP, international debt securities of government to GDP, and separately, the ratio of total debt securities of both financial and nonfinancial corporations to GDP. This measure includes both domestic and international markets, allowing us to capture the level of countries' financial integration.

These measures provide a broader view of financial market activity than more commonly used measures such as those related to stock market turnover, market capitalization or banks' total assets.

³ Although the dataset includes other sub-indices such as financial market efficiency and financial market access index, we do not include them in our analysis due to limited and irregular availability of data.

3.1.3. Bank-specific and macroeconomic control variables

We control for an array of standard bank-specific characteristics and macroeconomic variables. To account for individual banks' credit risk, we use growth of total loans (Fang et al., 2014). We use the logarithm of total assets to account for the potential size effect on banking stability, as too-big-to-fail expectations can destabilize efficient financial intermediation across the entire banking system. We include the leverage ratio measured as the ratio of equity to total assets. It constrains banks through the "capital at risk" effect. By operating with their own capital, banks bear part of the risk arising out of their activities (Tabak et al., 2012). However, higher capital levels might induce banks to increase their risk-taking (Anginer, Bertay, Cull, Demirgüç-Kunt, and Mare, 2021; Rime, 2001), since regulatory constraints on bank leverage lead to substitution away from debt into riskier assets, and also reduce banks' liquidity (Horváth et al., 2014). Thus, the overall effect of bank capital is ambiguous. We also control for cost-to-income ratio, a measure of banks' operational efficiency (OC). Higher costs generally characterize less efficient banks. However, banks that provide better quality service to their customers may incur higher expenditures, thereby depressing measured efficiency (Martinez Peria and Schmukler, 2001). We cannot control the quality of services offered by banks, making the effect of this variable indeterminate.

We also use several macroeconomic variables to control for economic development and the business cycle. To take account of volatility, we use GDP to control for economic growth (GDP growth rate). As economic development generally coincides with an increase in financial development, we also control for per capita GDP (Honohan, 2008).

3.2. Methodology

To examine the effect of financial development on deposit growth, we follow the work of Gaganis et al. (2020) and apply a bank fixed-effects model,⁴ which accounts for time-invariant unobserved heterogeneity across banks and control for year-specific effects. We also conduct a Hausmann test to confirm that the preferred model is indeed fixed effects as opposed to random effects. Our empirical model is:

$$DEP_{i,j,t} = \alpha_0 + \beta_1 FD_{i,j,t-1} + \delta_1 \sum BANK\ CONTROL_{i-1,j,t} + \gamma_1 \sum MACRO_{j,t-1} + \tau_t + \mu_i + \varepsilon_{i,j,t} \quad (2)$$

where *DEP* represents alternate measures of deposits including total deposit growth, retail transaction deposit growth and retail time deposit growth. *FD* represents alternate measures of financial development, the financial market index and financial market depth index. Subscript *i* denotes individual banks ($i = 1, 2, \dots, 4,853$), *j* denotes country ($j = 1, 2, \dots, 122$), and *t* time period ($t = 2002, 2003, \dots, 2015$). μ_i is the bank fixed-effects, τ_t is the time fixed-effects, and ε denotes the remaining disturbance terms.

3.3. Descriptive statistics and correlation analysis

Table 2 presents the summary statistics for our variables. We observe 6.4 % growth in deposits with a standard deviation of 15 %. *DDG* shows an average growth of 3.07 % and variation of 7.07 %, reflecting sticky characteristics of demand deposits compared to *DG*. On the other hand, we find a higher variation (8.55 %) in *TDG* with the mean value of 2.66 %, which is higher than that of *DDG* (7.07 %), suggesting *TDG* is more sensitive.

Our variables of interest, *FMI* and *FMD*, exhibit some variations. For instance, Norway (0.91) and Switzerland (0.91) show the highest level of the financial market index (FMI). These countries have shown the highest levels of *FMI* during 2007 and 2008. On the other hand, the USA shows a mean *FMI* value of 0.89 and a variation of 1.02 %. Among less financially developed economies, Kuwait shows the highest *FMI* (0.59), and Mali shows the lowest (0.00). The standard deviation of 0.21 for high financially developed economies and 0.09 for less financially developed economies reflects the greater heterogeneity among more financially developed economies. The *LOAN* growth shows a variation of 26.51 % and a mean value of 23.36. The *CAP* ratio has a mean value 13.24 % with 9.05 % standard deviation. Large banks show lower deposit growth, particularly in highly financially developed economies.

Fig. 1 depicts the consistent growth in *FMI* and *DEP*⁵ before the crisis period in high-financially developed economies. We observe a substantial decline in both *DEP* and *FMI* during the crisis period. The growth in *DEP* and *FMI* is observed in less financially developed economies in the pre-crisis period with a subsequent dip in both *FMI* and *DEP* during the crisis period. Although *DEP* recovered in post-crisis period, *FMI* exhibits a consistent decline (see Fig. 2).

We show the correlation matrix in Table 3. Our preliminary analysis shows a negative relationship between financial development measures and deposit growth. Total deposit growth is positively related to several bank characteristics such as capital, bank profitability and loans and negatively associated with size and efficiency. To ensure that correlations do not lead to multicollinearity, we check the variance inflation factors (VIFs). All VIF values are below 10, with means between 2 and 3, suggesting that multi-collinearity is not a concern.

4. Empirical results

One of the major concerns in our empirical analysis is endogeneity, arising from reverse causality. All independent variables are

⁴ Since a bank is associated with one country only, bank fixed effects also incorporate the country level variation (Gaganis, Lozano-Vivas, Papadimitri, and Pasiouras, 2020).

⁵ *DEP* represents the alternative variable of deposits such as *DG*, *DDG*, and *TDG*.

Table 2
Descriptive statistics.

Full Sample						
Variable	Observations	Mean	Std. Dev.	P25	P50	P75
Alternate dependent variables						
Deposit growth (DG)	39,259	6.43	15.38	-2.47	3.78	13
Demand deposit growth (DDG)	29,401	3.07	7.07	-0.52	1.52	5.32
Time deposit growth (TDG)	34,030	2.66	8.55	-1.97	1	6.27
Variable of interest: Financial development measures						
Financial Market Index (FMI)	39,259	0.53	0.29	0.35	0.54	0.79
Financial Market Depth Index (FMD)	39,259	0.54	0.34	0.24	0.54	0.91
Bank-level control variables						
Capital (CAP)	39,259	13.24	9.05	7.42	10.36	15.55
ROAA (ROA)	39,259	1.1	1.27	0.35	0.92	1.65
Growth of Gross Loans (LOAN)	39,259	16.47	26.51	0.26	10.22	26.34
Size (SZE)	39,259	13.84	2.25	12.26	13.83	15.5
Cost to Income (OC)	39,259	66.21	20.19	51.32	64.85	81.08
Macro level control variables						
Inflation (INF)	39,259	4.57	3.82	1.68	3.23	6.85
Log GDP per capita (GPC)	39,259	9.62	1.2	8.84	9.68	10.69
Economic Freedom Index (EFI)	39,259	65.12	10.99	53.2	64.7	76.1
GDP Growth rate (GDPG)	39,259	3.12	2.93	1.55	2.86	4.95
Crisis	39,259	0.18	0.38	0	0	0
PS	39,259	0.05	0.8	-0.75	0.15	0.64
Voice	39,259	0.39	0.96	-0.74	0.77	1.22
RQ	39,259	0.62	0.87	-0.33	0.72	1.52
GEFF	39,259	0.63	0.95	-0.36	0.51	1.59
ROL	39,259	0.49	1.09	-0.73	0.52	1.6
COC	39,259	0.44	1.17	-0.77	0.34	1.55
High Financially Developed Economies						
Alternate dependent variables						
Deposit growth (DG)	31,872	5.61	15.03	-2.8	3.18	11.45
Demand deposit growth (DDG)	22,752	2.55	6.42	-0.48	1.24	4.37
Time deposit growth (TDG)	27,838	2.35	8.32	-2.04	0.77	5.7
Variable of interest: Financial development measures						
Financial Market Index (FMI)	31,872	0.64	0.21	0.47	0.64	0.85
Financial Market Depth Index (FMD)	31,872	0.65	0.29	0.39	0.66	0.98
Bank-level control variables						
Capital (CAP)	31,872	13.13	9.22	7.15	10.14	15.42
ROAA (ROA)	31,872	1.01	1.19	0.33	0.85	1.49
Growth of Gross Loans (LOAN)	31,872	14.93	26	-0.34	8.75	23.99
Size (SZE)	31,872	13.98	2.35	12.34	14.03	15.8
Cost to Income (OC)	31,872	67	20.15	52.32	65.75	82.34
Macro level control variables						
Inflation (INF)	31,872	4.07	3.6	1.62	2.81	6.25
Log GDP per capita (GPC)	31,872	9.97	0.98	9.33	10.47	10.76
Economic Freedom Index (EFI)	31,872	66.54	11.36	53.1	68.3	78
GDP Growth rate (GDPG)	31,872	2.79	2.83	1.39	2.56	4.3
Less Financially Developed Economies						
Alternate dependent variables						
Deposit growth (DG)	7,192	10.01	16.41	-0.81	7.42	18.48
Demand deposit growth (DDG)	6,481	4.83	8.74	-0.77	3.14	9.47
Time deposit growth (TDG)	6,008	4.1	9.46	-1.65	2.42	9.05
Variable of interest: Financial development measures						
Financial Market Index (FMI)	7,192	0.08	0.09	0.02	0.04	0.1
Financial Market Depth Index (FMD)	7,192	0.1	0.09	0.03	0.06	0.12
Bank-level control variables						
Capital (CAP)	7,192	13.77	8.3	8.43	11.23	16.12
ROAA (ROA)	7,192	1.47	1.49	0.61	1.38	2.39
Growth of Gross Loans (LOAN)	7,192	23.36	27.79	4.86	17.36	36.73
Size (SZE)	7,192	13.22	1.65	12.07	13.15	14.42
Cost to Income (OC)	7,192	62.89	20.02	47.61	60.96	75.63
Macro level control variables						
Inflation (INF)	7,192	6.75	4	3.62	6.44	9.23
Log GDP per capita (GPC)	7,192	8.11	0.84	7.18	8.17	8.76
Economic Freedom Index (EFI)	7,192	59.08	6.17	54.2	58.6	63.9
GDP Growth rate (GDPG)	7,192	4.56	2.9	2.79	4.77	6.9

This table reports the summary statistics for the dependent variables, the variable of interest and the bank and macro level control variables. Variable definitions are provided in [Table 1](#).

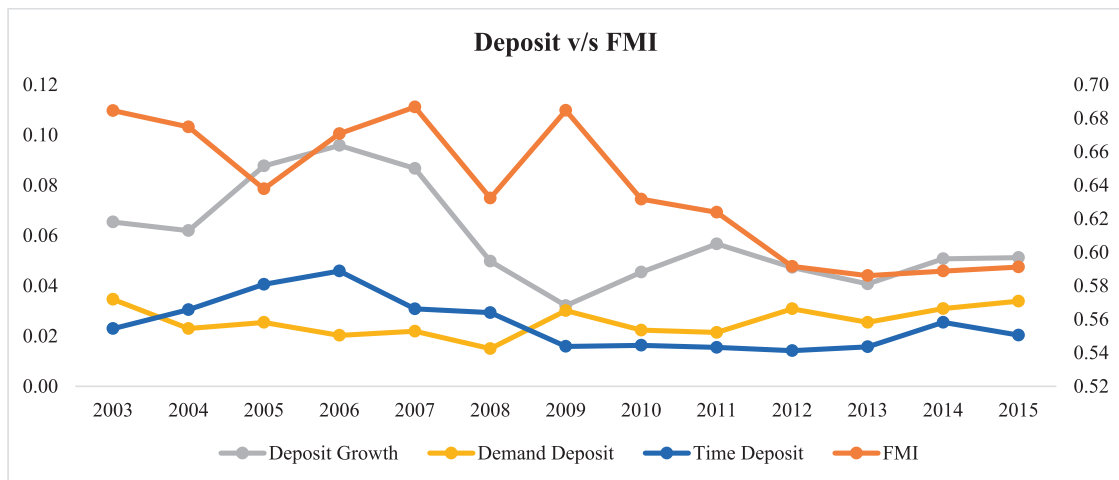


Fig. 1. Deposit v/s FMI: High Financially Developed Economies. Fig. 1 shows the trend of *DEP* and *FMI* for high-financially developed economies. The secondary axis value is for *FMI* and primary axis values for *DEP*.

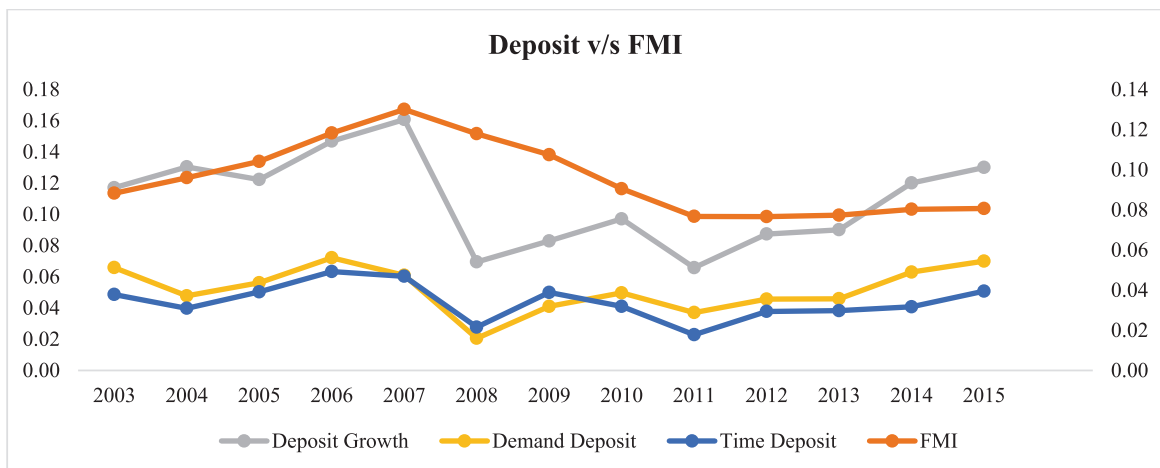


Fig. 2. Deposit v/s FMI: Less Financially Developed Economies. Fig. 2 shows the trend of *DEP* and *FMI* for less-financially developed economies. The secondary axis value is for *FMI* and primary axis values for *DEP*.

therefore lagged by one year to mitigate this. In particular, the documented correlation between *FMI*, *FMD* and *DEP* may reflect unobservable characteristics that affect their values. The omission of these factors might lead us to incorrectly attribute differences in *DEP* to differences in *FMI* and *FMD*. We control for time-invariant bank-specific characteristics, which may be correlated with omitted explanatory variables, by adding bank fixed effects to the regression specifications. This tends to remove purely cross-sectional correlation between *FMI*, *FMD* and *DEP*, greatly reducing the risk of spurious correlation. In all regressions, we control for time and bank fixed effects. The standard errors are clustered at the bank-level.⁶

4.1. Does financial development affect deposit growth?

The results show that higher financial market development is associated with higher deposits, as *DG* and *DDG* show a positive relationship with *FMI* (see columns 1 and 3 of Table 4) and *FMD*. Economically, a one standard deviation increase in *FMI* leads to a 17.08 % increase in *DG* and a 26.7 % increase in *DDG*. Although this finding contrasts with our initial hypothesis, it aligns with the theoretical framework of Song and Thakor (2010), reinforcing the view that financial markets and the banking system are complementary mechanisms that can coexist and coevolve. Conversely, *TDG* exhibits a negative relationship with *FMI* (see column 5). Economically, a one standard deviation increase in *FMI* leads to a 22.12 % decrease in *TDG*. This finding is consistent with the work of

⁶ We report several tests to check for potential endogeneity issues in the robustness section.

Table 3
Correlation Matrix.

	DG	DDG	TDG	FMI	FMD	CAP	ROAA	LOAN	SZE	OC	INF	GPC	EFI
DG	1												
DDG	0.52***	1											
TDG	0.61***	0.03***	1										
FMI	-0.14***	-0.16***	-0.09***	1									
FMD	-0.13***	-0.15***	-0.09***	0.95***	1								
CAP	0.09***	0.05***	0.05***	-0.13***	-0.15***	1							
ROAA	0.13***	0.08***	0.10***	-0.195***	-0.19***	0.29***	1						
LOAN	0.24***	0.13***	0.20***	-0.20***	-0.213***	0.04***	0.21***	1					
SZE	-0.08***	-0.10***	-0.04***	0.28***	0.31***	-0.53***	-0.13***	-0.14***	1				
OC	-0.05***	0.01*	-0.06***	0.01**	-0.03***	0.13***	-0.44***	-0.05***	-0.39***	1			
INF	0.08***	0.08***	0.06***	-0.45***	-0.50***	0.26***	0.26***	0.25***	-0.43***	0.13***	1		
GPC	-0.16***	-0.14***	-0.12***	0.79***	0.79***	-0.14***	-0.24***	-0.23***	0.28***	0.06***	-0.57***	1	
EFI	-0.10***	-0.12***	-0.06***	0.63***	0.71***	-0.24***	-0.20***	-0.24***	0.42***	-0.14***	-0.65***	0.71***	1
GDPG	0.14***	0.07***	0.11***	-0.35***	-0.35***	0.07***	0.26***	0.30***	-0.14***	-0.15***	0.34***	-0.47***	-0.35***

This table represents the correlation matrix for the dependent variables, the variable of interest, and the bank and macro-level control variables used in the baseline analysis. ***, **, and * denote statistical significance at the 1%, 5%, and 10%, respectively. Variables are defined in [Table 1](#).

Table 4
Deposit and Financial Development.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.786** (1.683)		2.827** (1.102)		-2.029** (0.963)	
FMD		2.805** (1.323)		0.997 (0.870)		-0.253 (0.740)
Operational Cost	0.034*** (0.010)	0.034*** (0.010)	-0.003 (0.005)	-0.003 (0.005)	0.018*** (0.006)	0.018*** (0.006)
ROAA	1.198*** (0.136)	1.198*** (0.136)	0.086 (0.078)	0.087 (0.078)	0.750*** (0.074)	0.746*** (0.074)
Capital	0.367*** (0.033)	0.366*** (0.033)	0.081*** (0.018)	0.080*** (0.018)	0.095*** (0.016)	0.094*** (0.016)
Size	-9.583*** (0.451)	-9.596*** (0.451)	-3.046*** (0.202)	-3.045*** (0.202)	-3.721*** (0.232)	-3.726*** (0.233)
Loan Growth	0.059*** (0.005)	0.059*** (0.005)	0.007*** (0.002)	0.007*** (0.002)	0.028*** (0.003)	0.028*** (0.003)
Inflation	-0.020 (0.049)	-0.032 (0.050)	-0.063** (0.028)	-0.063** (0.029)	0.051 (0.031)	0.047 (0.032)
Income	1.305** (0.660)	1.457** (0.657)	-0.893** (0.363)	-0.779** (0.354)	2.685*** (0.382)	2.630*** (0.386)
GDPG	-0.019 (0.049)	-0.025 (0.049)	-0.069** (0.029)	-0.065** (0.029)	-0.074** (0.030)	-0.075** (0.030)
EFI	0.010 (0.050)	0.001 (0.049)	-0.032 (0.026)	-0.041 (0.025)	-0.002 (0.028)	0.004 (0.028)
Constant	112.750*** (8.238)	112.781*** (8.246)	55.261*** (4.083)	55.714*** (4.084)	25.633*** (4.786)	24.971*** (4.803)
Bank fixed effects	YES	YES	YES	YES	YES	YES
Year dummy	YES	YES	YES	YES	YES	YES
F-test	89.142	88.559	31.253	30.893	46.242	46.146
R ²	0.118	0.118	0.040	0.040	0.057	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030

The table reports coefficients and robust standard errors (in parentheses). Columns (1–2) present the results for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of previous year, columns (5–6) show the results for the retail time deposits to total assets of previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. All variables are lagged one year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Variable definitions are provided in Table 1.

Lin (2020) and Pollet and Wilson (2010). Time deposits, like debt products, provide easy access for investors and offer higher yields compared to checking and savings accounts. Higher yields encourage investors to shift their funds from financial markets to time deposits. This result is particularly important for *DG* and *DDG* because of their positive association with financial markets. It suggests that the development of financial markets increases total and retail transaction deposits, which are cost-effective and stable in nature, providing liquidity, thereby making the banking system more robust.

For bank-level control variables, our findings suggest that banks with higher deposits tend to show higher operating costs, greater profitability, higher capital, and higher loan growth. Large banks tend to hold lower deposits. Further, higher inflation increases the cost to depositors of holding demand deposits (due to low or no interest on them), therefore decreasing *DDG*.

Our findings show economic growth decreases *DDG* and *TDG*, suggesting that higher economic growth stimulates credit creation which leads to a decrease in both *DDG* and *TDG*. We also find that an increase in per capita income increases *DG* and *TDG*. Finally, a negative relationship between *INCOME* and *DDG* and a positive relationship between *INCOME* and *TDG*, suggest a shift from demand deposits to time deposits for higher yield, when income increases (Godley, 1999). Perhaps saving (checking) and time deposits respond differently to inflation and income growth.⁷

4.2. Relationship between financial market development and bank deposits: Based on countries' financial development level

To examine the impact of variation in financial development, countries are classified into two subgroups: highly and less financially developed economies. This classification is based on the mean value of the financial development index for the year 2015 across all countries in our sample.⁸ Countries with a financial development index below the mean are categorized as less financially developed, while those with values above the mean are classified as highly financially developed. We further applied an interaction term between high financially developed economies and financial market development indexes, to examine the effects of financial market development on deposits in financially developed economies.⁹ Our results are reported in Table 5.

We find that financial market development has a negative and statistically significant effect on *DEP*, with coefficients significant at the 1% level (see columns 1–6). Conversely, the interaction between financial market indices and high-financially developed economies reveals a positive association with *DEP*, indicating that in more financially developed economies, the advancement of financial markets contributes to higher deposit levels, thereby supporting our hypothesis. In contrast, the negative relationship between financial market development and deposits in less financially developed economies suggests a competitive dynamic between financial markets and the banking system. This pattern suggests that an improvement in one financial system may perhaps come at the expense of the other, aligning with Korajczyk's (1996) argument regarding the fragmentation of financial systems in emerging markets. Such

⁷ Given that U.S. banks account for a substantial proportion of the observations in our sample, we rerun the baseline regressions after excluding them. The results remain broadly consistent with our main findings, thereby reinforcing the robustness of the analysis. For the sake of brevity, these results are not tabulated but are available upon request.

⁸ We also conducted Chow test to confirm the structural break in our sample.

⁹ We thank an anonymous referee for suggesting this to us.

Table 5
Interaction Between FMI, FMD, and Financial Development.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	-20.133*** (4.925)		-8.733*** (3.095)		-11.918*** (3.234)	
FMD		-15.198*** (4.555)		-2.875 (2.599)		-10.119*** (2.697)
HL_FDI × FMI	26.190*** (5.101)		13.237*** (3.256)		10.884*** (3.328)	
HL_FDI × FMD		19.118*** (4.616)		4.387 (2.689)		10.406*** (2.729)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	88.000	86.918	30.324	29.427	45.318	45.641
R ²	0.119	0.119	0.041	0.040	0.058	0.058
NOBS	39,064	39,064	29,233	29,233	33,846	33,846

The table reports coefficients and robust standard errors (in parentheses). The dummy variable 1 is assigned for highly financially developed economies (HL_FDI) and 0 for less financially developed. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ bank and year fixed effects. All variables are lagged one year. ***, **, and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

fragmentation may lead to the growth of financial markets at the cost of the banking sector, and vice versa, indicating potential competition between the two systems in less financially developed economies. Nevertheless, in financially developed economies, banks' activities extend beyond traditional deposit-taking and lending. They often engage in financial management services such as investment advisory, consultancy, and portfolio management. These services complement financial markets by attracting investors and, in turn, enable banks to attract more deposits. This mutually reinforcing relationship promotes the co-evolution of financial markets and the banking system, as highlighted by Song and Thakor (2010).

4.3. Impact of 2007–2008 financial crisis

Our analysis includes the 2007/2008 global financial crisis period which may have an impact on our results (Peni and Vähämaa, 2012; Schoors and Yudaeva, 2013). Therefore, we introduce a crisis dummy where the dummy takes a value of 1 for the crisis period and 0 otherwise. We identify the financial crisis period for each individual country from the World Bank database.¹⁰ The results are reported in Table 6.

We find a positive relationship between FMD and DG (see column 2). The result for DDG is consistent with our main findings reported in section 4.1. In contrast, TDG exhibits negative relationship with FMI, suggesting competition for long-term funds between financial markets and banks. Furthermore, we find evidence of a decline in deposits during the crisis period.

To account for the potential confounding effect of the crisis on financial market development in high and less financially developed economies, we include the interaction term *crisis* × *financial market* × *financial market development* in our empirical model. The coefficient on this interaction term shows a positive relationship with deposits (DEP). Perhaps counterintuitively, our results indicate that, although overall deposits declined during the crisis, in countries with more developed financial markets or integrated financial systems, funds may have shifted from financial markets to bank deposits, indeed resulting in an increase in DEP. A plausible explanation is that, during periods of heightened financial uncertainty, households tend to rebalance their portfolios toward safer investment products (Gábor-Tóth and Georgarakos, 2018).

5. Robustness tests

5.1. Instrumental variable (IV) analysis

We have controlled for many country- and bank- level variables, but our results may still suffer from an omitted variable bias. To find a suitable instrument for FMI and FMD, we follow the literature on Law and Finance. For instance, investor protection (Claessens and Laeven, 2003), legal origin, shareholder rights (Claessens et al., 2002), legal institutions (Johnson et al., 2000), and enforcement of law (Beck and Levine, 2002) are important predetermined factors for the development of a financial system (Beck and Levine, 2005). Financial products are legal contracts between two parties, which need to be enforced by the law to be more effective (Levine, 2002). Tadesse (2002) reports that a market-based system underperforms in a weak legal environment and a robust rule of law is a primary condition for financial markets. Following the literature, we apply a law and order (LO) index collected from the World Bank as an instrument for FMI and FMD. The index value ranges between 0 and 1. We do not see simultaneity bias between FMI, FMD and LO. The first stage F-test results are greater than 10 in all the regression results, which is a rule of thumb for instrument validity. We conduct the

¹⁰ <https://databank.worldbank.org/reports.aspx?source=1250&series=GFDD.OI.19>.

Table 6
Deposit Growth And Financial Development: 2007/2008 Financial Crisis Analysis.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	2.203(1.716)		2.946 ^{***} (1.101)		-3.427 ^{***} (0.989)	
FMD		3.333 ^{**} (1.370)		1.484 [*] (0.901)		-0.719(0.771)
Crisis	-8.287 ^{***} (0.974)	-7.263 ^{***} (0.858)	-1.021 [*] (0.566)	-0.706(0.529)	-3.058 ^{***} (0.583)	-2.687 ^{***} (0.509)
Crisis × FMI × HL FDI	8.724 ^{***} (1.239)		1.948 ^{***} (0.705)		2.185 ^{***} (0.763)	
Crisis × FMD × HL FDI		6.884 ^{***} (1.008)		1.432 ^{**} (0.606)		1.672 ^{***} (0.621)
Bank & country –level controls	YES	YES	YES	YES	YES	YES
Bank & year fixed effects	YES	YES	YES	YES	YES	YES
F-test	85.689	85.322	29.007	28.714	45.380	45.178
R ²	0.122	0.122	0.041	0.040	0.060	0.060
NOBS	39,064	39,064	29,233	29,233	33,846	33,846

The table reports coefficients and robust standard errors (in parentheses). The financial crisis period for countries is identified according to the World Bank report. Columns (1–2) present the results for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. We have also employed triple interaction among Crisis, financial market indices, and the dummy variable for high-financially developed economies. In all regression equations, we employ firm and year fixed effects. Standard errors are reported in parentheses ^{***}, ^{**}, and ^{*} denote statistical significance at the 1%, 5% and 10% levels, respectively.

Anderson canonical LM test for under-identification and Cragg-Donald test for weak identification of instruments. The results show a *p* value less than 0.05, rejecting the null hypothesis for under and weak identification. The results are presented in Appendix A.2.

The results for instrumental variable methods are robust and consistent. The coefficients for *FMI* and *FMD* remain positive for *DG* and *DDG*, suggesting co-evolution of financial markets and the banking system. On the contrary, we have evidence of competition between banks and financial market for long-term investment (*TDG*). The results confirm the findings that financial market development increases low-cost deposits for banks. The results for other control variables are broadly consistent with the findings reported in section 4.1.

5.2. Income level

The income level of households determines their consumption and savings behavior. High-income individuals tend to save more, and they seek high-yield investment opportunities. [Beverly and Sherraden \(1999\)](#) argue that since lower-income households generally have less access to and knowledge of sophisticated high yield financial products, they are more likely to save for the short term. This difference has been observed even at the country-level ([Rosenzweig, 2001](#)). Therefore, to capture the differences in countries' income levels, we split the dataset into two subgroups: high income and lower-upper-middle income countries,¹¹ by creating a dummy variable 1 for high income and 0 for lower-upper-income countries. We also examine the marginal effects of income and financial market development by applying the interaction term between income and financial markets development indexes. Our results are reported in Appendix A.3.

We document a positive relationship between interaction terms and *DEP*. On the contrary, *FMI* shows a negative relationship with *TDG*, which is consistent with the main findings reported in section 4.1.

5.3. Market concentration

In most countries, only a few banks hold a major market share, indicating oligopolistic market structure. These banks become “too big to fail”. The banking literature has shown the importance of bank concentration and capital structure ([Gonzalez and González, 2008](#)), bank spread ([Peria and Mody, 2004](#)), and deposit markets ([Calem and Carlino, 1991](#)). Therefore, to capture the asymmetric impact of banking market structure and scale effects on deposit rates ([Calem and Carlino, 1991](#); [Demirgüç-Kunt and Levine, 1996](#)), we classified the sample into high and low market concentration groups by creating dummy variables. We calculate the Herfindahl Index (HHID) based on deposit share and for each country, and split the sample based on the median. Further, we interacted the dummy variables with *FMI* and *FMD*, to identify the marginal effects of financial market development indexes in a concentrated market. The results are available in Appendix A.4.

We find a positive relationship between *FMI*, *FMD* and *DEP*, except for *TDG*. *TDG* shows a negative relationship with financial market indexes. These results are consistent with the main findings as reported in section 4.1. On the contrary, while the interaction between *FMI*, *FMD*, and market concentration shows a negative relationship with *DDG*, this association turns positive for *TDG*, indicating a portfolio rebalancing activity from risky assets (financial markets) to safe investments (*DEP*) during the growth of financial

¹¹ The classification of the income level of the countries is based on the definition in the World Bank database. Due to the small number of countries, we merge the lower and the upper-middle income countries into one group.

markets.¹²

5.4. Deposit insurance

Most countries offer deposit insurance to bank deposit holders to protect and incentivize deposit holders to use deposit products. The safety of deposits attracts households to deposit their money in the banking system (Chen et al., 2021). Iyer and Puri (2012) reported that deposit insurance decreases the risk of bank run. Although deposit insurance makes bank deposits sticky (Fueda and Konishi, 2007; Nys et al., 2015), it also encourages depositors to search for high yield deposits without conducting proper due diligence of banks, thereby decreasing market discipline (Quintero-V, 2023). Therefore, we expect varying relationships between financial markets and *DEP*.

For our analysis, we extract the insured deposit- to- GDP ratio data from the World Bank database.¹³ We created dummy variable 1 for high-deposit insured and 0 for less-deposit insured countries. This classification is based on the median value of deposit insurance. Our results are reported in Appendix A.5.

The interaction term between *FMI*, *FMD* and high deposit insurance shows a positive relationship with *TDG*, suggesting that in high-insured economies, as financial markets grow, households with contrarian views rebalance their portfolios by shifting their money into time deposits. While we find a positive relationship between *FMI* and *DDG*, *TDG* shows a negative relationship *FMI* and *FMD*.

5.5. Supervisory power

Countries' banking systems vary according to their supervision. Highly supervised banking systems are considered safe (Cihak et al., 2013) as they face stronger enforcement by supervisory authorities to take action to prevent and rectify problems relating to bank lending, making them more attractive to households for credit and deposits (Barth et al., 2013; Fang et al., 2014). To verify if heterogeneity in bank supervision affects our results, we apply an interaction term between bank supervision power and financial market indexes in our empirical analysis. We use the banking supervisory survey conducted by Anginer et al. (2021) to construct a supervisory index.¹⁴ We create a dummy variable 1 for high and 0 for less supervised economies, based on the median value of the index.

The results for the interaction term between high supervisory power and financial market indexes shows a positive relationship with *DG* and *DDG*, suggesting that in highly supervised market, the growth in financial market leads to bank deposits growth and strengthening the banking system stability. On the contrary, results for *FMI* and *FMD* shows a negative relationship with *DG* and *DDG*. These findings are aligned with the work of Beck and Levine (2005), who show that market development can reduce the role of the banking system in less regulated markets. Overall, our findings highlight the importance of coordinated reforms aimed at developing the financial market and strengthening supervision framework. The results are presented in Appendix A.6.

5.6. Channel effect

According to economic and financial development literature, more developed financial markets increase economic activity in countries (Levine, 1997) and promote economic growth (Greenwood and Smith, 1997). This economic growth, in turn, increases a country's national savings, which can be further allocated to banks and financial markets for intermediation (Greenwood and Smith, 1997).

Therefore, we expect two-way effects of financial market development. First, financial markets increase wealth in the hands of households, allowing households to allocate a proportion of their increased wealth to banks, thereby increasing bank deposits. To verify this effect, we apply a mediation effect model,¹⁵ which uses a two-step regression method (Duan, et al., 2021). In the first step, we use log of gross domestic savings (GDS) per capita as a dependent variable. We find a significant positive relationship between *FMI*, *FMD*, and *GDS per capita*. In the second step, we include *GDS per capita* as a control variable and observe a positive relationship between *GDS per capita* and *DEP*. The relationships between *FMI*, *FMD* and *DEP* remain consistent with our main findings. The results are reported in Appendix A.7.

5.7. Quantile regression

To allow for heterogeneity among financial development levels (Bhattacharya et al., 2018; Loayza and Ranciere, 2006), we conducted a quantile regression. We divided the full sample into three sub-samples based on the financial development level in 2015. The

¹² Investors having contrarian view shift their funds to the safe investment products from financial markets, when financial markets grow (Lakonishok, Shleifer, and Vishny, 1994).

¹³ The survey was conducted in 2013.

¹⁴ We select eight questions related to supervisory power and assign 1 for positive and 0 for negative response. The median value of responses was 7.

¹⁵ More specifically, in the first step we verify the effects of independent variables on channel. In the second step we apply the channel as an additional control variable. If the main independent variable becomes insignificant it suggests complete mediation, and if independent variables remain significant, it indicates partial mediation (Wu, Wen, Zhang, and Huang, 2024).

results are presented in Appendix A8. Our findings show a negative relationship between *DG*, *TDG*, and *FMI* in the first quantile. On the contrary, *FMI* shows a positive relationship with *DG* and *DDG* for the second and third quantiles, suggesting a complementary relationship between financial markets and banking system in financially developed economies. However, we find a negative relationship between *TDG* and financial market indices in the first and second quantiles, indicating that banks and the financial market compete for long-term deposits.

5.8. Banking system stability- Z-score

Brown et al. (2020) identify that deposit withdrawal is high for less stable banks. To attract deposits, less stable banks offer higher interest to attract depositors (Egan et al., 2017). Nevertheless, Arping (2019) argues that a higher level of capital allows banks to reduce their deposits. Stable banks use low-cost funding to fulfil their lending demand. Thus, we expect that a stable banking system will decrease deposits when financial markets become more important. To measure the country-level bank stability, we use Z-score¹⁶. We split the sample into high and less stable banking system based on the median of the Z-score at country level for the analysis period. The results are tabulated in Appendix A.9.

The results for *FMI* and *FMD* are consistent with the main findings as reported in Table 4. We also used the interaction between *FMI*, *FMD*, and *Z-Score* (a dummy variable). The results show that in a stable banking system, increased financial market development decreases *DG* and *DDG*. *TDG* shows a positive association with the interaction term (*financial market indices* × *Z-Score*). The results suggest that as financial markets grow, households shift their liquid funds (*DDG* and *DG*) to high-yield *TDG*, causing a decrease in *DDG* and increase in *TDG*. This result is consistent with the contrarian view of investment philosophy (Lakonishok et al., 1994).

5.9. Impact of governance indicators

Apart from banking and macroeconomic factors, other factors such as a country's political stability, civil war, government effectiveness, regulatory quality, and corruption, affect banking (Asteriou et al., 2021; Brewer and Jackson, 2006) and financial markets (Hearn et al., 2017). We thus used country governance indicators developed by Kaufmann et al. (2007). The indicators cover a broad range of countries' governance such as voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption.¹⁷

We find a significant positive relationship between *VOICE* and *DG*. Government effectiveness shows a positive relationship with *TDG*, while political stability shows a negative relationship with *DG* and *TDG*. Further, control of corruption (*COC*) has a positive impact on *DG* and *TDG*. The direction of the relationship between financial market indices (*FMI* and *FMD*) and *DEP* are broadly consistent with the main results. The results are presented in Appendix A.10.

5.10. Bank vs market-based economies

Economists have divided countries based on dominance of bank-based and market-based economies. Our sample also includes economies which are dominated by either banks or financial markets. To capture this differences, we have therefore divided the data into bank-based economies and market-based economies, based on the classification derived by Demirgüç-Kunt and Levine (2001). We use dummy variable 1 for market-based economy and 0 for the bank-based. We further apply an interaction term between market based economy and financial market indexes to capture the marginal effects of financial market development in market-based economies on *DEP*. We document a positive relationship between interaction terms and *DEP*, suggesting that growth in financial markets leads to growth for bank deposits in market-based economies. These results are consistent with the findings of financial developed economies. On the contrary, *FMI* and *FMD* shows a negative relationship with *DG* and *TDG*, highlighting the existence of competition between financial markets and banking system. The results are presented in Appendix A.11.

5.11. Sub-group analysis

To further assess the robustness of our main results, we performed a series of subgroup analyses across different economic and institutional dimensions. We first examined differences in *financial development*, comparing high-financially developed economies with less-financially developed economies. The results remain broadly consistent with the main findings (see Online Appendix O.1). Next, when partitioning the sample by *income level*, the results for both high-income and low-income countries remain consistent with those obtained from the main specification incorporating the interaction term (see Online Appendix O.2). We also conducted subgroup analysis by *market concentration*, distinguishing between high- and low-concentration economies. The findings for high-concentration economies and financial market indices are broadly in line with our interaction term results (see Online Appendix O.3). Similarly, the analysis based on *insurance coverage* indicates that results for high-insured economies and financial market indices are consistent with the main findings (see Online Appendix O.4). Finally, the analysis by *supervisory intensity* reveals that outcomes for high-supervised economies and financial market indices reinforce the conclusions derived from the interaction term specification (see Online

¹⁶ Bank Z-score is popular measure for bank stability (see Gaganis et al., 2020).

¹⁷ Some of these variables may be highly correlated. A VIF analysis confirms multicollinearity among the variables. Hence, we introduce the variables separately in our analysis.

Appendix O.5).

6. Conclusion

This study investigates how financial market development affects bank deposits. To measure countries' financial markets development, we use the financial market index and a sub-index which not only cover value creation (market capitalization to GDP), efficiency (stock turnover to GDP ratio), and liquidity (stock turnover to GDP ratio) but also domestic and international debt markets. The effects of financial market development on bank deposits are not the same across all financial market indices (including sub-indices), or the financial and economic development levels of the countries involved. For example, financial market indices show a positive impact on *DG* and *DDG*, suggesting development of financial markets increases bank-level deposits. Time deposits show a negative relationship with financial markets, indicating increased competition between financial markets and the banking system to attract investment from households. In subgroup analysis based on financial development level, the financial system shows a co-evolving and coordinating character in highly financially developed economies, whereas in less-financially developed economies, financial markets and the banking system compete with each other.

The general perception of academics is that the development of financial markets supports competition within the banking system. However, the financial architecture literature suggest that most countries show competition between the banking system and financial markets while some papers suggest that these two systems complement each other. This paper evaluates the relationship between these two systems, financial markets and the banking system, on banks' funding. Our findings support the argument of [Song and Thakor \(2010\)](#) for coexistence and competition for *DG* and *DDG*. Time deposits as an investment product show a negative relationship with financial markets development, suggesting that as financial development occurs, banks find it difficult to attract long-term time deposits ([Hubbard and O'Brien, 2012](#)). There are clear policy suggestions from this study. For instance, a well-developed financial system provides an environment which supports financial markets and the banking system growing together. Our subgroup analysis suggests that regulators should encourage competition and supervise banks. These measures will help banks attract deposits as stable sources of funding, and to comply with the Basel-III liquidity norms.

CRedit authorship contribution statement

Nikhil Srivastava: Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **David Tripe:** Writing – review & editing, Writing – original draft, Supervision, Methodology. **Mamiza Haq:** Writing – review & editing, Writing – original draft, Validation, Supervision, Resources, Methodology, Formal analysis. **Mui Kuen Yuen:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Formal analysis.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A

A.1. Sample composition

This table reports country-wise number of banks, number of observations, average value of financial market index, financial market depth index, and Herfindahl Index based on deposits.

Country	Number of banks	Number of Observations	FMI	FMD	HHID
<i>High Financially Developed Economies</i>					

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Country	Number of banks	Number of Observations	FMI	FMD	HHID
Australia	25	151	0.85	0.91	1420.51
Austria	63	564	0.61	0.47	3506.61
Bahrain	11	108	0.5	0.68	2295.05
Barbados	6	37	0.25	0.28	3487.84
Belgium	25	215	0.47	0.65	1986.63
Brazil	116	890	0.46	0.36	1301.36
Bulgaria	18	151	0.09	0.11	1281.14
Canada	41	188	0.79	0.94	1581.73
Chile	23	124	0.4	0.46	608.19
China	116	730	0.58	0.52	1017.79
Croatia	29	287	0.13	0.23	2306.17
Cyprus	16	133	0.44	0.38	2610.07
Czech Republic	17	149	0.24	0.16	2261.66
Denmark	51	474	0.49	0.59	3055.65
Finland	10	71	0.66	0.71	3506.61
France	113	1030	0.65	0.85	1610.34
Germany	132	1202	0.74	0.69	1158.86
Greece	16	113	0.58	0.52	1412.94
Hong Kong	28	258	0.73	0.83	972.36
Hungary	25	209	0.49	0.24	1750.87
India	60	612	0.5	0.49	721.08
Indonesia	63	587	0.31	0.2	1096.84
Ireland	12	80	0.57	0.59	2198.55
Israel	11	126	0.42	0.39	1835.26
Italy	107	697	0.75	0.63	1175.47
Japan	150	1616	0.73	0.69	653.13
Jordan	10	114	0.44	0.44	3368.46
Kuwait	5	54	0.35	0.43	2952.66
Luxembourg	82	682	0.61	0.75	545.19
Macao	9	48	0.08	0.03	2066.32
Malaysia	20	60	0.61	0.82	2009.34
Malta	7	62	0.34	0.19	3506.61
Mauritius	15	124	0.27	0.2	1431.57
Mexico	57	489	0.34	0.24	476.00
Mongolia	3	9	0.1	0.18	3506.61
Morocco	9	77	0.26	0.2	1918.73
Netherlands	33	235	0.75	0.92	3376.58
New Zealand	12	80	0.39	0.33	1790.53
Norway	16	106	0.79	0.69	3506.61
Oman	6	72	0.32	0.35	2456.62
Peru	16	143	0.26	0.19	2407.61
Philippines	20	169	0.36	0.48	1050.31
Poland	51	325	0.34	0.2	659.26
Portugal	25	170	0.54	0.63	2022.16
Qatar	6	71	0.55	0.62	3479.72
Korea, Rep.	16	69	0.86	0.83	740.18
Moldova	14	108	0.27	0.03	1550.56
Russian Federation	912	7036	0.49	0.41	697.38
Saudi Arabia	8	104	0.61	0.52	1109.97
Singapore	13	89	0.75	0.88	2935.64
Slovenia	14	141	0.33	0.21	1656.75
Spain	38	258	0.85	0.92	1947.74
Sweden	23	207	0.72	0.93	2668.11
Switzerland	154	1402	0.82	0.94	1045.63
Thailand	19	204	0.6	0.56	856.50
Turkey	29	255	0.54	0.3	777.64
United Arab Emirates	15	96	0.54	0.52	1355.84
United Kingdom	119	871	0.81	0.98	976.32
United States	823	7140	0.89	0.98	435.71
Less Financially Developed Economies					
Albania	12	85	0.02	0.03	2065.46
Algeria	15	133	0.02	0.03	2107.25
Angola	13	90	0.03	0.07	1903.10
Armenia	14	120	0.03	0.03	1156.15
Azerbaijan	23	178	0.03	0.07	2311.27
Bangladesh	18	71	0.05	0.09	754.30
Belarus	18	116	0.05	0.11	2445.68
Bolivia	12	105	0.03	0.06	1875.71
Bosnia and Herzegovina	21	153	0.03	0.05	1092.85
Botswana	10	79	0.08	0.14	1602.20

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Country	Number of banks	Number of Observations	FMI	FMD	HHID
Burkina Faso	5	51	0.02	0.03	2223.72
Burundi	3	12	0.04	0.09	3506.61
Cambodia	15	90	0.02	0.03	1834.57
Cameroon	8	75	0.02	0.03	1482.53
Colombia	7	30	0.24	0.17	2941.42
Costa Rica	25	223	0.04	0.04	958.91
Dominican Republic	45	345	0.02	0.03	1436.33
Ecuador	25	218	0.04	0.05	2065.78
Egypt, Arab Rep.	24	267	0.34	0.25	1536.84
El Salvador	14	113	0.06	0.11	1588.8
Estonia	9	65	0.14	0.15	3506.61
Ethiopia	7	74	0.02	0.03	3388.63
Gabon	3	12	0.02	0.03	3506.61
Ghana	18	110	0.04	0.07	592.17
Guatemala	27	225	0.03	0.03	1465.73
Guyana	3	32	0.03	0.08	3506.61
Honduras	19	159	0.05	0.1	1179
Iceland	3	9	0.42	0.54	3506.61
Jamaica	6	54	0.17	0.34	3116.25
Kazakhstan	26	225	0.31	0.24	1579.52
Kenya	29	273	0.07	0.11	788.23
Kyrgyz Republic	7	47	0.17	0.03	2731.98
Latvia	20	169	0.08	0.06	1130.85
Lebanon	30	138	0.11	0.22	683.97
Libya	7	40	0.02	0.03	3429.78
Lithuania	10	101	0.07	0.08	2378.91
Madagascar	6	48	0.02	0.03	2955.35
Malawi	5	53	0.03	0.04	3030.95
Mali	7	53	0.02	0.03	2040.93
Mauritania	6	44	0.02	0.03	2821.3
Nepal	30	233	0.04	0.07	477.13
Nicaragua	5	41	0.02	0.03	2605.71
Niger	4	37	0.02	0.04	3179.54
Nigeria	22	89	0.22	0.06	1178.46
Pakistan	7	57	0.29	0.21	3088.4
Panama	53	388	0.12	0.24	706.14
Paraguay	14	138	0.03	0.03	1098.56
Romania	21	178	0.06	0.05	1459.44
Rwanda	7	37	0.02	0.03	2731.98
Senegal	11	92	0.02	0.03	1703.93
Serbia	28	150	0.06	0.06	774.31
Sierra Leone	5	21	0.02	0.03	3122.91
Slovak Republic	16	134	0.05	0.06	1544.94
Sri Lanka	16	51	0.18	0.11	1227.51
Eswatini	4	50	0.02	0.03	2639.23
Trinidad And Tobago	8	73	0.16	0.3	2452.2
Tunisia	16	149	0.07	0.07	711.28
Uganda	17	151	0.03	0.06	1352.32
Ukraine	22	177	0.08	0.13	985.01
Uruguay	18	176	0.04	0.04	1907.79
Venezuela, Rb	21	106	0.05	0.13	824.42
Vietnam	37	258	0.22	0.15	1268.54
Zambia	13	116	0.02	0.05	1369.99
Albania	12	85	0.02	0.03	2065.46
Total	4,853	39,259	0.29	0.30	1,892.70

A.2. Instrumental variables (IV)

The table reports coefficients and robust standard errors (in parentheses). Columns (1–2) present the results for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of previous year as the dependent variables. Law and order index is used as instrument variable for financial market indices. The two key independent variables are FMI and FMD. In all regression equations, we employ bank and year fixed effects. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively. Hansen-J over-identification test shows that instrument is exactly identified.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	19.776 ^{***} (6.926)		37.737 ^{***} (12.729)		-14.005 ^{***} (3.643)	
FMD		11.733 ^{***} (4.095)		17.362 ^{***} (5.691)		-8.408 ^{***} (2.191)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.494	85.056	25.827	27.891	41.741	42.136
R ²	0.116	0.118	-0.026	0.021	0.051	0.053
NOBS	37,316	37,316	27,674	27,674	32,353	32,353
F	797.41	938.25	71.57	134.82	815.22	986.71
LO	0.384 ^{***}	0.648 ^{***}	0.132 ^{***}	0.287 ^{***}	0.424 ^{***}	0.706 ^{***}
Under id test (Anderson canonical LM)	2109.69	3846.31	160.75	588.01	2359.34	3917.92
Weak id test (Cragg-Donald F Stat)	2177.69	4078.66	161.14	594.69	2458.76	4199.38

A.3. Income level

The table reports coefficients and robust standard errors (in parentheses). We classified sample into high and low-income countries by assigning dummy variable 1 for high-income countries (HL_IC) and 0 for lower-upper-middle income countries. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ^{***}, ^{**}, and ^{*} denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	0.425(2.341)		-2.760(1.697)		-5.011 ^{***} (1.288)	
FMD		2.228(1.619)		0.029(1.128)		-1.755 ^{**} (0.870)
HL_IC × FMI	6.906 ^{**} (3.080)		8.239 ^{***} (2.050)		7.246 ^{***} (1.751)	
HL_IC × FMD		1.924(2.333)		1.858(1.515)		5.872 ^{***} (1.342)
Constant	112.647 ^{***} (8.225)	112.431 ^{***} (8.246)	54.001 ^{***} (4.084)	54.907 ^{***} (4.113)	25.613 ^{***} (4.777)	24.143 ^{***} (4.791)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	86.374	85.404	30.900	29.744	45.113	45.267
R ²	0.118	0.118	0.041	0.040	0.058	0.058
NOBS	39,259	39,259	29,401	29,401	34,030	34,030

A.4. High versus low market concentration

The table reports coefficients and robust standard errors (in parentheses). We classified sample into high and low market concentration by assigning dummy variable 1 for high-concentration economies (HL_HHID3) and 0 for less-concentrated economies. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ^{***}, ^{**}, and ^{*} denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.269 [*] (1.872)		4.584 ^{***} (1.321)		-2.820 ^{***} (1.063)	
FMD		2.632 [*] (1.423)		2.039 ^{**} (1.021)		-0.822(0.781)
HL_HHID3 × FMI	2.484(3.722)		-5.938 ^{***} (2.030)		4.420 [*] (2.437)	
HL_HHID3 × FMD		1.180(3.008)		-3.604 [*] (1.574)		4.578 ^{**} (1.965)
Constant	113.276 ^{***} (8.299)	112.997 ^{***} (8.284)	53.924 ^{***} (4.130)	55.204 ^{***} (4.101)	26.625 ^{***} (4.871)	25.873 ^{***} (4.849)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.779	84.888	30.699	30.337	44.218	44.207
R ²	0.118	0.118	0.040	0.040	0.058	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030

A.5. High versus low deposit insured economies

The table reports coefficients and robust standard errors (in parentheses). We classified sample into high and less insured economies by assigning dummy variable 1 for high-deposit insured economies (HL_DI) and 0 for less-insured economies. Columns (1–2) present the result for deposit growth to total assets of previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	2.545(2.161)		3.915 ^{**} (1.565)		-3.641 ^{***} (1.220)	
FMD		2.148(1.610)		1.934(1.248)		-1.623 [*] (0.886)
HL_DI × FMI	3.517(3.130)		-2.526(2.027)		4.855 ^{**} (1.940)	
HL_DI × FMD		2.069(2.370)		-1.994(1.563)		4.950 ^{***} (1.437)
Constant	113.021 ^{***} (8.264)	113.122 ^{***} (8.267)	55.396 ^{***} (4.101)	55.871 ^{***} (4.108)	25.769 ^{***} (4.809)	25.514 ^{***} (4.835)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	84.608	84.004	29.779	29.211	43.835	44.128
R ²	0.118	0.118	0.040	0.040	0.058	0.058
NOBS	39,058	39,058	29,212	29,212	33,881	33,881

A.6. High versus low supervisory power

The table reports coefficients and robust standard errors (in parentheses). We classified sample into high and low supervised economies by assigning dummy variable 1 for high supervised economies (HL_SP) and 0 for low supervised economies. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	-11.290 ^{***} (2.924)		-10.465 ^{***} (2.475)		-0.557(2.261)	
FMD		-9.309 ^{***} (2.240)		-7.417 ^{***} (1.685)		1.469(1.549)
HL_SP × FMI	17.685 ^{***} (3.469)		15.811 ^{***} (2.743)		-1.857(2.493)	
HL_SP × FMD		13.992 ^{***} (2.535)		10.280 ^{***} (1.845)		-2.015(1.696)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	86.081	85.177	31.199	30.313	44.096	44.018
R ²	0.119	0.119	0.042	0.041	0.058	0.057
NOBS	39,057	39,057	29,230	29,230	33,859	33,859

A.7. Channel effect

The table reports coefficients and robust standard errors (in parentheses). Columns (1) and (2) show the results for GDS per capita. Columns (3–4) present the result for deposit growth to total assets of the previous year, columns (5–6) show the results for retail transaction deposit growth to total assets of previous year, columns (7–8) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ bank and year fixed effects. All the independent variables are lagged one year. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	GDS per capita	GDS per capita	DG	DG	DDG	DDG	TDG	TDG

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FMI	0.573*** (0.028)		4.014** (1.691)		2.658** (1.096)		-1.937** (0.964)	
FMD		0.530*** (0.023)		3.040** (1.337)		0.737 (0.873)		-0.219 (0.745)
GDS per capita			1.707*** (0.582)	1.711*** (0.583)	0.876*** (0.318)	0.883*** (0.320)	0.685* (0.351)	0.733** (0.353)
Bank & country-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-test	852.548	814.349	84.755	84.242	29.916	29.612	43.937	43.857
R ²	0.591	0.595	0.118	0.118	0.040	0.040	0.058	0.058
NOBS	39,132	39,132	38,774	38,774	28,969	28,969	33,716	33,716

A.8. Quantile regression

The table reports coefficients and robust standard errors (in parentheses). Panel A presents the results for quantile at 25 %, Panel B shows the results for the country with 50 % and above financial development index, and Panel C exhibits the results for highly financially developed economies, falls under the category of 75 % and above. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A- Quantile (25 %)						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	-52.402*** (8.490)		-9.871 (13.036)		-24.750** (11.057)	
FMD		-50.318 (36.608)		15.006 (28.514)		-24.401 (21.596)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	15.732	15.868	8.675	8.781	3.468	3.508
R ²	0.200	0.194	0.124	0.124	0.104	0.100
NOBS	1,212	1,212	1,081	1,081	1,002	1,002
Panel B- Quantile (50 %)						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	4.389** (1.707)		2.487** (1.130)		-2.226** (0.987)	
FMD		3.221** (1.357)		0.848 (0.889)		-0.383 (0.769)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	73.842	73.318	25.220	24.938	40.051	39.907
R ²	0.114	0.114	0.039	0.038	0.056	0.056
NOBS	34,258	34,258	24,990	24,990	29,796	29,796
Panel C- Quantile (75 %)						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	7.341*** (1.863)		5.839*** (1.234)		-0.989 (1.058)	
FMD		4.006*** (1.455)		2.583*** (0.991)		-0.360 (0.825)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	61.040	59.824	23.310	22.267	31.293	31.321
R ²	0.110	0.110	0.043	0.042	0.052	0.052
NOBS	28,719	28,719	19,758	19,758	25,010	25,010

A.9. Banking stability-Z-score

The table reports coefficients and robust standard errors (in parentheses). The country level banking Z score is collected from the World Bank report. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ bank and year fixed effects. Standard errors are reported in parentheses ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively.

statistical significance at the 1 %, 5 % and 10 % levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	5.582 ^{**} (2.247)		8.847 ^{***} (1.443)		-3.423 ^{***} (1.196)	
FMD		3.743 ^{**} (1.690)		8.072 ^{***} (1.206)		-2.426 ^{***} (0.890)
HL_Z × FMI	-5.380 [*] (3.033)		-13.280 ^{***} (1.975)		4.299 ^{**} (1.860)	
HL_Z × FMD		-3.507(2.289)		-13.064 ^{***} (1.503)		6.743 ^{***} (1.385)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	82.341	81.791	29.094	30.396	41.843	42.237
R ²	0.117	0.117	0.042	0.042	0.056	0.057
NOBS	38,378	38,378	28,598	28,598	33,263	33,263

A.10. World governance indicators

The table reports coefficients and robust standard errors (in parentheses). Panel A presents the results using Voice and Accountability as a control variables, Panel B for Rule of Law, Panel C for Regulatory Quality, Panel D for Political Stability, and Panel E for Control for Corruption. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ bank and year fixed effects. All the independent variables are lagged by one year. The ^{***}, ^{**}, and ^{*} denote statistical significance at the 1, 5, and 10 percent levels, respectively.

Panel A-Voice and Accountability						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.518 ^{**} (1.681)		2.837 ^{**} (1.102)		-2.093 ^{**} (0.966)	
FMD		2.168(1.340)		0.880(0.880)		-0.382(0.749)
Voice	3.807 ^{***} (0.914)	3.689 ^{***} (0.923)	0.696(0.506)	0.623(0.511)	0.767(0.562)	0.746(0.567)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.784	85.140	30.265	29.870	44.243	44.156
R ²	0.119	0.118	0.040	0.040	0.057	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030
Panel B-Rule of Law						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.538 ^{**} (1.707)		2.806(1.105)		-2.260 ^{**} (0.992)	
FMD		2.669 ^{**} (1.331)		0.956(0.873)		-0.333(0.744)
ROL	1.316(1.102)	1.425(1.093)	0.580(0.608)	0.586(0.608)	0.958(0.672)	0.755(0.658)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.203	84.647	30.049	29.682	44.576	44.496
R ²	0.118	0.118	0.040	0.040	0.057	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030
Panel C-Regulatory Quality						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.727 ^{**} (1.705)		3.030 ^{***} (1.107)		-2.195 ^{**} (0.972)	
FMD		2.755 ^{**} (1.347)		1.191(0.877)		-0.357(0.749)
RQ	0.254(0.912)	0.249(0.915)	-1.008 [*] (0.531)	-0.924 [*] (0.533)	0.717(0.547)	0.586(0.548)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.359	84.780	29.887	29.544	44.371	44.306
R ²	0.118	0.118	0.040	0.040	0.058	0.058
NOBS	39,259	39,259	29,401	29,401	34,030	34,030
Panel D-Political Stability						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.078 [*] (1.696)		2.872 ^{***} (1.106)		-2.355 ^{**} (0.962)	
FMD		2.559 ^{**} (1.328)		1.010(0.871)		-0.349(0.741)
PS	-2.020 ^{***} (0.497)	-2.074 ^{***} (0.493)	0.144(0.243)	0.096(0.242)	-0.849 ^{***} (0.296)	-0.776 ^{***} (0.295)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes

(continued on next page)

(continued)

Panel A-Voice and Accountability						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.981	85.605	30.052	29.673	44.273	44.201
R ²	0.119	0.119	0.040	0.040	0.058	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030
Panel E-Control for Corruption						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	2.762(1.709)		2.725 ^{**} (1.108)		-2.332 ^{**} (0.976)	
FMD		1.818(1.356)		0.825(0.890)		-0.512(0.753)
COC	3.652 ^{***} (0.646)	3.649 ^{***} (0.652)	0.415(0.349)	0.455(0.356)	1.039 ^{***} (0.394)	0.964 ^{**} (0.395)
Bank & country –level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	87.238	86.744	30.027	29.694	44.149	44.067
R ²	0.119	0.119	0.040	0.040	0.058	0.057
NOBS	39,259	39,259	29,401	29,401	34,030	34,030
Panel F-Government Effectiveness						
	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	3.763 ^{**} (1.692)	2.783 ^{**} (1.336)	2.851 ^{***} (1.104)	1.024(0.878)	-2.207 ^{**} (0.968)	-0.441(0.744)
GEFF	0.234(0.814)	0.192(0.817)	-0.150(0.466)	-0.112(0.469)	1.693 ^{***} (0.514)	1.648 ^{***} (0.515)
Bank & country-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank & year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	85.359	84.780	29.887	29.544	44.371	44.306
R ²	0.12	0.12	0.04	0.04	0.06	0.06
NOBS	39,259	39,259	29,401	29,401	34,030	34,030

A11. Bank versus market-based economies

The table reports coefficients and robust standard errors (in parentheses). We classified sample into market-based and bank-based countries by assigning dummy variable 1 for market-based countries and 0 for bank-based countries. Columns (1–2) present the result for deposit growth to total assets of the previous year, columns (3–4) show the results for retail transaction deposit growth to total assets of the previous year, columns (5–6) show the results for the retail time deposits to total assets of the previous year as the dependent variables. The two key independent variables are FMI and FMD. In all regression equations, we employ firm and year fixed effects. The ^{***}, ^{**}, and ^{*} denote statistical significance at the 1 %, 5 %, and 10 % levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
	DG	DG	DDG	DDG	TDG	TDG
FMI	-7.275 ^{***} (2.640)		-2.053(1.620)		-7.784 ^{***} (1.672)	
FMD		1.482(2.030)		-0.760(1.185)		-0.228(1.310)
Mkt based × FMI	14.498 ^{***} (4.378)		9.013 ^{***} (2.321)		12.075 ^{***} (2.589)	
Mkt based × FMD		5.088(3.618)		3.345 [*] (1.852)		5.803 ^{***} (2.116)
Constant	87.264 ^{***} (12.538)	83.228 ^{***} (12.422)	52.425 ^{***} (5.314)	51.542 ^{***} (5.272)	42.098 ^{***} (7.965)	38.660 ^{***} (7.894)
Bank and country- level controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank and year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
F-test	41.596	41.107	20.586	20.109	31.501	31.094
R ²	0.11	0.11	0.04	0.04	0.08	0.08
NOBS	23,705	23,705	21,073	21,073	20,223	20,223

Appendix B. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.intfin.2025.102278>.

Data availability

Data will be made available on request.

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